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Ancient Astronomical Observations and the Accelerations of the Earth and Moon

ROBERT R. NEWTON

The many ancient astronomical observations collected here were made between 763 B.C. and 1241 A.D. Some are observations of solar eclipses made by court chroniclers, historians, and others who were not astronomers. Some are technical observations made by professional astronomers. The data from the observations include times for the beginnings of the seasons, conjunctions and occultations involving the moon and planets, the times and magnitudes of solar and lunar eclipses, and the places where solar eclipses were total or nearly so.

Dr. Newton analyzes these data to determine the moon's secular acceleration and the secular part of the earth's spin rate. The results show that the rates at which the day and the month are getting longer are about twice as large as those that most scientists have been willing to accept and that a source of acceleration of unknown origin is influencing the earth's rotation to about the same degree as tidal friction. Dr. Newton points out a logical fallacy which has repeatedly occurred in the identification of solar eclipses. In earlier studies this fallacy caused the results from large solar eclipses to differ seriously from the results obtained from other types of data. When the fallacy is eliminated, results from solar eclipses agree well with those from other types of data.

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